



Lead in Drinking Water from Submersible Pumps

Water Protection Program fact sheet

10/2005

A recent study by the Environmental Defense Fund and Natural Resources Defense Council indicated new submersible brass pumps, used in private wells, leach lead into drinking water.

Why brass pumps?

Brass, an alloy, contains lead, which makes the metal suitable for molding. Brass is durable and resists corrosion. It is also used in many faucets, valves and other fittings. Brass containing less than eight percent lead is considered "lead free" by the United States Environmental Protection Agency. However, brass with a higher percentage of lead may be dangerous to human health.

How does exposure to lead affect my health?

Lead is poison that affects virtually every system in the body. It is particularly harmful to the developing brain and nervous system of fetuses and young children.

Even low levels of lead cause adverse effects on the central nervous system, kidneys, and blood cell producing systems. Low blood lead levels, which do not cause distinctive symptoms, are associated with decreased intelligence and impaired mental capabilities and coordination. Many other effects begin at these low levels, including stunted growth, decreased hearing acuity and lowered ability to maintain a steady posture.

Drinking water is not a major contributor to total lead exposure; however, lead in drinking water is probably absorbed more completely than lead in food. Adults absorb 35-50 percent of the lead they drink and the absorption rate for children may be greater than 50 percent.

How do I know if I have been exposed?

The only way to tell if you or your children have elevated blood lead levels is to have a lead screening test. The Missouri Department of Health and your local health department will perform screening tests for children ages six months to six years who have been exposed to drinking water with lead. Other resources for blood lead screening include your physician or hospital.

How was the research done?

Fifteen new pumps representing five different models were tested. One stainless steel model and four models of brass submersible pumps were tested three times. Each was submersed in about 2.3 liters of water for 24 hours.



After a day, the pumps were lifted from the water and drained. The water was analyzed for lead content. The containers were drained and filled with fresh water and the pumps were once again submersed for 24 hours. This procedure was repeated daily for 30 days. Lead levels in the water were very high the first day. Within 10 days, levels dropped to less than half the initial readings, and then leveled off for the last 20 days.

How does this study relate to my drinking water?

Most well water in Missouri is hard (has lots of minerals) and is not acidic. These characteristics cause the water to be noncorrosive to metals and other materials. Because of this, submersible pumps in most parts of Missouri are not expected to leach as much lead as in areas of the country with “softer” water.

Extensive well monitoring by the Missouri departments of Natural Resources and Health indicated less than two percent of the water systems exceeded the standard level of lead in drinking water.

In 1993, public water systems throughout the state conducted tests to determine lead and copper content of water in residential homes. Water systems were required to take these samples at high-risk homes -- those with lead solder, lead pipes or lead service lines. The samples were taken after the water had not been used for at least six hours. Thus, in many cases the water had been sitting in brass faucets for this amount of time.

Although the state research dealt with lead pipes and brass faucets, not brass submersible pumps, results indicated that Missouri well water may not corrode as much lead as softer water would.

Does my pump add lead to my drinking water?

A lead problem in water may be caused by a pump or a water distribution system.

The only way to know if your water contains lead is to have your water tested. EPA suggests taking a sample after running the water for two minutes, following a period of not using the water for at least six hours, i.e., overnight or while at work. Take the sample to a certified lab for testing.

Pump installers should be aware that brass pumps must be thoroughly flushed before being put into service.

Are there water-use patterns that may contribute to high lead levels?

Yes. Very low water use. Water in contact with brass pumps for long periods of time may have more lead.

What water-use patterns may help avoid lead contamination?

Water drawn from a well, even if the pump contributes excessive amounts of lead, will be diluted as water is used.

A well does not run for 12 hours. Lead accumulates in the pump. When the well is turned on, lead from the pump enters the pressure tank. As water is run it becomes more diluted and the lead level drops. Lead levels will continue to go down as long as water is being used.

Recommendations for residences with brass submersible pumps less than one year old

If you have children or are pregnant, you should avoid drinking water during times of low usage. Drink bottled water or keep pitchers or jugs of water drawn during times of high usage. High-use periods would be just after taking baths or showers, doing laundry, and watering the lawn or garden. Have your water tested.

Families without children should avoid drinking water during times of low usage. If you must drink water during these periods, flush the water for 5 minutes.

Recommendation for residences with brass submersible pumps over one year old

Children under the age of six and pregnant women should avoid drinking water during times of low usage.

Once again, the only way to know if your water contains lead is to have it tested.

For more information on issues concerning private well drilling and well construction, write the Missouri Department of Natural Resources, Division of Geology and Land Survey, P.O. Box 250, Rolla, MO 65401; or call (573) 368-2165. For lead issues on public water systems, contact the Department's Public Drinking Water Branch at (573) 751-5331, or call toll-free at 1-800-361-4827.

Questions on childhood lead poisoning, blood lead testing or monitoring private wells should be directed to the Missouri Department of Health, Lead Program, at (573) 526-4911 or 1-800-392-0272.

For More Information

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